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Atmospheric Measurement Techniques Discussions

Interactive comment on "Apparatus for Dry Deposition of Aerosols on Snow" *by* Nicholas D. Beres and Hans Moosmüller

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The manuscript describes customized instruments for experimentally depositing BC, BrC, and mineral dust on snow. The manuscript includes some cursory analysis of the results, based on measurements of the spectral HCRF (hemispherical-conical reflectance factor). However, given the wealth of the data gathered, this analysis could be more robust and help the reader appreciate the importance of the work.

Specifically:

The y-axes of Figures 4-7 are labeled "directional reflectance." The caption should include the geometryâĂŤsolar zenith angle, observation angle and azimuth with respect to the sun. Although the "H" in HCRF designates "hemispherical," most of the illumina-

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tion when skies are clear is in the direction from the sun.

The reflectance measurements (in the Supplement) should be sufficient to estimate the imaginary part of the refractive index. Skiles et al. (2016) have published a method to retrieve the imaginary part of the complex index of refraction from measurements of reflectance. It would be interesting to apply their method to these data. Moreover, Skiles' method could be compared to the published measurements for hematite (Scanza et al., 2015). Knowledge of the bulk optical properties of the absorbing particulates would be needed to model snow reflectance. Also important would be the size distribution, or at least the effective spherical radius, along with the particulate concentration in the upper snowpack. The shape of the spectral reflectance between the blue and red wavelengths depends partly on the size of the contaminating particles.

For the historical context on the experimental approach, the manuscript should address the work of Conway et al. (1996). Specifically, they examined the fate of deposited black carbon and volcanic ash, either remaining near the surface or washed downward during melt depending on size and composition. Sterle et al. (2013) also examined the fate of deposited BC, an important consideration in assessing the effect of absorbing aerosols on hydrology and climate.

A few nits: "Dozier" not "Dozer" page 1, line 23. "Sierra Nevada" means snowy mountain range, so eliminate "Mountains" on page 2, line 43. How about "Inside the" instead of "Inside of the" on page 3, line 9? In the Acknowledgments, you should include Ned Bair, who helped you a lot.

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